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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/163,402	09/30/1998	NAOTO SANO	684.2745	9937
5514	7590	11/06/2003	EXAMINER	
FITZPATRICK CELLA HARPER & SCINTO			SCOTT JR, LEON	
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NEW YORK, NY 10112			PAPER NUMBER	

2828

DATE MAILED: 11/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/163,402

Applicant(s)

SANO ET AL.

Examiner

Leon Scott, Jr.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on RCE filed 9/03/02.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-8,10-15,17-29 and 66-91 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-8,10-15,17-29 and 66-91 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Leon Scott, Jr.

Primary Examiner

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After a discussion with Mr. Jack Cubert, reg. no.24,245 on behalf of Mr. Steven E. Warner reg. no. 33,326 the attorney of record in this application, it was agreed that the Amend't dated 4/4/03 (Amend't J) and the Rejection dated 4/24/03 probably crossed in the mail; thus to give the 4/4/03 Amend't due consideration the Rejection dated 4/24/03 is hereby being withdrawn in favor of the following Rejections:

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1,2,4-8,10-15,17-29, 66-79 and 80-91 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In line 2 of claims 1,13,20 and 80 since applicant is not allowed to claim by inference the sealing material is missing from the claims in that it is the sealing material which allows the chamber to sealingly store; claims 1,13,20 and 80 express a desired result while failing to recite the structure and/or means necessary to provide that result. Further, it is not clear that the totally reflecting mirror in line 4 of claim 1 and the partially reflecting window in line 6 of claim 1 form a resonant cavity indeed simply because the ;light is amplified between the mirror and the window does not suggest that a resonant condition has been established in a resonant cavity; claim 1 is indefinite and

incomplete. In line 3 of claim 1 "a discharge electrode" should read ~~discharge electrodes~~— and in line 3 of claims 13,20 and 80 "a discharging electrode" should read ~~discharging electrodes~~— since a single electrode is not capable of producing an electric discharge which is necessary to pump the laser gas; claims 1,13,20 and 80 are incomplete. In lines 6 and 7 of claim 1; in lines 5 and 6 of claim 13, and in lines 4-7 of claim 80, it is not clear how the output window partially reflects(claims 1,13 and 80) the laser light exclusive of some coating; claims 1,13 and 80 are indefinite and incomplete. Further in line 6 of claim 80 an output window does not amplify the laser light. Likewise in lines 7 and 8 of claim 20 no method step has been recited which will partially reflect the laser light exclusive of some coating; claim 20 is indefinite and incomplete. In lines 9-11 of claim 1, it is not clear if the gas is circulated through the discharge region of the electrodes and an electric discharge results ,then the used gas is returned again to the discharge region which depletes the lifetime of the laser; if such is not the case then it is not clear what happens to the used gas and it is not clear how fresh gas is provided to replenish the depleted gas and extend the lasing lifetime, claim 1 is indefinite and incomplete. It is not clear in lines 13 and 14 of claims 1 and 13 how the blower is operated in accordance with a state of the electric discharging, what state of electric discharging; claims 1 and 13 are indefinite and incomplete. In lines 13-17 of claim 1 it is not clear how the laser can be in a *condition to output light when no laser gas is excited* by the electric discharge and no laser light is emitted; claim 1 is indefinite and incomplete. In line 15 of claim 13 it is not clear within the context of claim language what constitutes a *non-exposure state*, claim 13 is indefinite In line 18 of claim 13 it is not clear within the context of claim language what constitutes an *exposure state*, claim 13 is indefinite. In line 3 of claim 14 it is not clear what constitutes an *exposure job*, claim 14 is indefinite and incomplete. Claim15 depends from claim 14, thus it is not clear how the operation means simultaneously stops the revolution of said blower before a start of the exposure job(claim 15) and increases a rotation speed of the blower in

response to a start of an exposure job(claim 14); claim 15 s indefinite and incomplete. The recitation the exposure device in line 17 of claim 13 lacks a clear antecedent basis. The preamble of claim 20 recites a semiconductor device manufacturing method however the claim is devoid of any manufacturing method step which contains a semiconductor device, accordingly applicant is required to amend the preamble to be consistent with the steps claimed or to delete the claim; claim 20 is indefinite and incomplete. It is not clear within the context of claim language what constitutes *operation states of a laser gas supply means and exciting means* in lines 5 and 6 of claims 66 and 73: (a) either the gas is supplied to the chamber or it is not; (b) either the gas is pumped or it is not; clearly the language of applicants claim provide for some undefined, undisclosed operational state; claims 66 and 73 are indefinite and incomplete. Further it cannot be determined from the language of claims 66 and 73 how such states are controlled; claims 66 and 73 are functional at the point of novelty and thus is indefinite and incomplete. In line 6 of claims 66 and 73 it is not clear how the exciting means provides laser gas non-excitement, claims 66 and 73 are indefinite and incomplete. In claim 67 how does the blower supply gas, what gas does it supply a fresh gas or the used gas; claim 67 is indefinite and incomplete. In claim 70 it is not clear how resonator excites anything, claim 70 is indefinite and incomplete. In lines 1-3 of claim 73 no structure has been recited which is capable of supplying a laser gas to and excitation region, lacking such structure the claim recites a desired result while failing to recite the structure and or means-plus-function necessary to achieve said result; claim 73 is indefinite and incomplete. In line 3 of claim 73 simply because the gas is excited does not mean that it is optically pumped, and if it is not *optically pumped* no output can be produced; claim 73 is indefinite and incomplete. In lines 12-15 of claim 80 what constitutes a *state of electrical discharging from said discharge electrode* and how does such a *state provide a first circulation capacity*; claim 90 is indefinite and incomplete. In lines 15 and 16 of claim 80 how is the output of the light being

prepared, what does the preparing; claim 80 is indefinite and incomplete. In line 16 of claim 80 what is the structure which produces the second gas circulation capacity; claim 80 is indefinite and incomplete. In claims 80-91 it is not clear how the gas circulation capacity is changed if no new gas is provided in the overall device; clearly if the gas is only circulated the total gas capacity of the device remains fixed; claims 80-90 are indefinite and incomplete. In line 12 of claim 80 applicants claim *"control means adapted to control said circulation means..."* and in line 6 of claim 86 applicants claim *"control means operable to control the gas circulation capacity of the circulation means..."*; it would appear that applicants have two different control means controlling the circulation means with no connective relationship among the two different controls; thus it is not clear how the controls function in the device as a whole, claim 86 is indefinite and incomplete. In lines 7 and 8 of claim 86 it is not clear what constitutes an *exposure operation state*; claim 86 is indefinite and incomplete. Likewise in lines 8 and 9 of claim of claim 86 it is not clear what constitutes a *non-exposure operation state*; claim 86 is indefinite and incomplete. Further it is pointed out to applicants that as claimed the exposure device of claim 86 is a part of the already claimed gas laser device of claim 80, thus when one consider the structure of the *exposure device* it becomes clear that applicants exposure device has: (a) *a main assembly for exposing a substrate*; (b) *a control means operable to control the gas circulation capacity of the circulation means*; thus it is not clear nor can it be determined from the language of the claims how elements (a) and (b) above constitute and *exposure device*; claim 86 is indefinite and incomplete. In lines 2 and 3 of claim 87 what constitutes an *exposure job signal*; claim 87 is indefinite and incomplete. Further it is not clear how this *exposure job signal* functions in the device as a whole; claims 87-90 are indefinite and incomplete. In line 2 of claim 91 since it is not clear what the steps are which will permit some unknown pattern to be *lithographically* transferred to a substrate, claim 91 recites a desired result while failing to recite the method steps necessary

to provide that result. Further it is not clear that the steps or the structure necessary to provide a *lithographic transfer* has been recited in the claim; lacking such steps or structure the transfer will not occur; claim 91 is indefinite and incomplete. Claim 86 is an apparatus claim and claim 91 is an improperly dependent method claim, thus it is not clear from the recitation of claim 91 what applicants are relying upon to carry the claim, the method or the apparatus; claim 91 is further indefinite and incomplete.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 66,67 and 69 are rejected under 35 U.S.C. 102(b) as being anticipated by Clark et al ('327) .

Clark et al ('327) discloses: a XeCl excimer laser(see col. 5 lines 30-68 and col. 6 lines 1-8 and 54-65) comprising : a chamber for sealingly storing an excimer laser gas(see col. 4 lines 15-21, col. 9 lines 64-68 and col 10 lines 1-9); discharging electrodes disposed to sandwich and electrically pumping the laser gas(col. 10 lines 20-48) in the discharge region; inherent in the reference is a gas supply means(32, see col.9 lines 1-32); a blower for circulating the laser gas within the chamber(see col. 10 lines 14-16), so that a laser gas passing an electrical discharge region of said discharge electrodes is circulated in said chamber and is returned to the electrical discharge region of said discharge electrodes, and operating means for operating said blower in accordance with a state of the electrical discharge from said discharge electrodes, including and a means for operating the blower rotation in an in-operation state in which the laser gas is

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excited by the electric discharge from the discharge electrodes and the laser light is being outputted(see col. 11 lines 46-68 and col. 12 lines 1-11). The means for state of non-excitement is inherent in the device and constitutes any means which will shut the laser off.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1,2,4-8,10-15,17-29, 68,70-79 and 80-90 are, insofar as definite, rejected under 35 U.S.C. 103(a) as being unpatentable over Clark et al ('327) as applied above when considered with Larson et al ('933) and Mizouchi ('138) and Uemura ('217) .

Clark et al ('327) discloses: a XeCl excimer laser(see col. 5 lines 30-68 and col. 6 lines 1-8 and 54-65) comprising : a chamber for sealingly storing an excimer laser gas(see col. 4 lines 15-21, col. 9 lines 64-68 and col 10 lines 1-9); discharging electrodes for electrically pumping the laser gas(col. 10 lines 20-48); inherent in the reference is a total reflection optical element for totally reflecting laser light produced by the electrical discharge from the discharge electrodes and an output optical element for partially reflecting the laser light and for outputting a portion of the laser light amplified between the total reflecting optical element and said output optical element(see fig.3, also see col. 4 lines 48-65, col. 5 lines 38-41, col. 12 lines 35-57 and col. 13 lines 1-30); a blower for circulating the laser gas within the chamber(see col. 10 lines 14-16), so that a laser gas passing an electrical discharge

region of said discharge electrodes is circulated in said chamber and is returned to the electrical discharge region of said discharge electrodes, high pulse rate operation is achieved by virtue of high-speed recirculating gas flow between the rail electrodes. Rotating magnetic shaft seals are used for isolating the laser gas recirculation blower from the blower motor (see abstract); and operating means for operating said blower in accordance with a state of the electrical discharge from said discharge electrodes, including a first means for operating the blower rotation and a second means for operating the blower rotation in an in-operation state in which the laser gas is excited by the electric discharge from the discharge electrodes and the laser light is being outputted(see col. 11 lines 46-68 and col. 12 lines 1-11).

Larson et al ('933) discloses an excimer gas laser having a blower motor with adjustable timing such that a blower fan protection circuit(1101) prevents the motors from being damaged by operating at to high of a speed, protection circuit(1101) continually compares the fan speed with a preset maximum limit, If the fan speed exceeds the preset limit, a disable signal is sent to the motor drive circuits which prevents further operation of the motors until the disable signal is removed, thus the blower rotation is in a stand-by-state in which no laser gas is excited by the electrical discharge from the discharge electrodes. The disable signal is sent for a predetermined period of time, after which the operation of the motors, and thereby the blower rotation can be re-initiated (see col. 7 lines 33-46).

Mizouchi ('138) discloses: an exposure apparatus for exposing a substrate to the laser light supplied from said gas laser(see col.1 lines 25-40, col. 2 lines 16-20).

Uemura ('217) discloses: an exposure apparatus for the manufacture of semiconductors which uses as an exposure light source a laser such as an excimer laser requiring gas replacement. The excimer laser generally uses mixed gas comprising three kinds of gases, i.e., halogen gas such as fluorine, inert gas such as krypton or argon, and rare gas such as helium or neon is enveloped in a laser chamber and the halogen gas and the

inert gas react to cause a discharge in the chamber to thereby emit laser light(see Fig. 1A and see abstract, col.1 lines 47-52).

Given the structure of the references it would be obvious that one of ordinary skill in the art: a) desiring to adjustably control the blower gas circulation means of an excimer laser would be motivated to substitute the blower and motor controls disclosed in Larson et al('933) for those inherent in Clark et al('327) since both blowers are used to circulate the gas in the chamber between the discharge electrodes; and b) desiring to use the excimer laser of the disclosed reference combination in an exposure apparatus to expose a substrate to the excimer laser light would be motivated to substitute the excimer laser of Clark et al('327) for the excimer laser of Mizouchi('138) since depending upon the desired result or intended use it is well known to substitute one excimer laser for another; applicants' device is obvious. As to the operation of the blower with a state of the electrical discharge region of the electrodes, it is pointed out that the first means for operating the blower rotation in a stand-by state in which no laser gas is excited by the electrical discharge and thus no laser light is outputted is inherent in the reference device by shutting the laser off or is readily achieved by a switch or series of switches which shuts the laser off and then on and/or shut off the gas flow, clearly the single shut-off switch is inherent in the reference combination: claims 1,13 and 20 are obvious. Further it would be obvious to one of ordinary skill in the art desiring to use an excimer laser in an exposure apparatus to use the excimer laser of Clark et al ('327) in the exposure apparatus of Mizouchi ('138) for exposing a substrate to the laser light supplied from said gas laser of Clark et al ('327). The main assembly is inherent in the reference device. As to claim 14, it would be obvious to one of ordinary skill in the art desiring to control the speed of the blower in the reference combination of Clark et al ('327) and Mizouchi('138) to incorporate the adjustable blower motor timing protection circuit of Larson et al ('933) into the excimer gas laser of claim 80 and/or the exposure apparatus of the reference combinations such that a blower fan protection

circuit(1101) prevents the motors from being damaged by operating at to high of a speed in the excimer gas laser and/or the exposure device, protection circuit(1101) continually compares the fan speed with a preset maximum limit, Thus, depending upon the desired result or intended use it would be obvious to one of ordinary skill in the art that the speed of the blower can be increased before, during or after the start of the exposure job, and If the fan speed exceeds the preset limit, a disable signal is sent to the motor drive circuits which prevents further operation of the motors until the disable signal is removed, thus the blower rotation is in a stand-by-state in which no laser gas is excited by the electrical discharge from the discharge electrodes. The disable signal is sent for a predetermined period of time, after which the operation of the motors, and thereby the blower rotation can be re-initiated. Claims 5-7,11,12,68,80 and 81-89 are obvious.

As to claim 17, the blower blade being rotatably supported within the chamber would be obvious to one of ordinary skill in the art desiring to cool the excimer gas and to remove heat in the chamber would be motivated to dispose a support for the blower within the chamber. Claims 1,13-15 and 17-20 are obvious.

As to claims 2 and 8, it would be obvious that in the stand-by state that the blower must be stopped if no gas is to be excited (see claim 1 line 15) since not to stop the blower would produce circulation of the gas through the discharge region thereby producing a laser output; claims 2 and 8 are obvious.

As to claims 4,10 and 90, the blower blade being rotatably supported within the chamber; it would be obvious that depending upon the desired result or intended use, for example desiring to cool the excimer gas and to remove heat in the chamber one of ordinary skill in the art would be motivated to dispose a support for the blower within the chamber; claims 4,10 and 90 are obvious.

As to claim 20 it is clear that the structure of the reference combination will inherently produce the steps of the method; applicants' device is obvious.

As to the diminished Markush groups of claims 6,12,19,21-29,84 and 85 it is clear that all the claimed excimers are encompassed by the disclosure of Uemura('217) in that all the excimer gases function in substantially the manner in substantially the same environment and one of ordinary skill in the art desiring to use a particular excimer laser having a specific line would be motivated to substitute any of the excimer gases of Uemura('217) into the reference combination; claims 6,12,19,21-29,84 and 85 are obvious.

As to claims 70-72 and 77-80, It is pointed out to applicants that since a laser resonator is defined by a pair of optical elements, one optical element being partially reflecting and the other optical element being total reflecting; thus, even *if* the above recited disclosure to the resonant cavity were not explicitly recited, the structure of claims 70-72 and 77-79 would be inherent in the reference combination; applicants' device is obvious. Still the output window of the claims would be obvious in that one of ordinary skill in the art would, depending upon the desired result or intended use, be motivated to substitute an output window for the output element of the reference combination; claims 1,13,20,70-72 and 77-80 are obvious/.

Fukaya et al (JP02072687A) is cited for its teaching of a rotating speed of a Roots blower variable with an inverter and performing laser operation from a low-speed gas flow to a high-speed gas flow.

JP 10097986A document is cited for its teaching of an exposure system using a krypton fluorine excimer laser.

Nakuma et al is cited for its teaching of an exposure apparatus using excimer lasers.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leon Scott, Jr. whose telephone number is 703-308-4884. The

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examiner can normally be reached on Monday - Friday, 6:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul P. Ip can be reached on (703)308-3098. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7721 for regular communications and 703-308-2864 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-3431.

**Leon Scott, Jr.
Primary Examiner**

**Leon Scott, Jr.
Primary Examiner
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**lsjr
November 3, 2003**